

# **Santa Barbara County Operational Area Interoperable Communications Study Final Report**

June 25, 2012



**DELTAWRX**  
management consultants



# Agenda

- ☐ Review Project Goals and Status
- ☐ Provide Overview of Current Systems
- ☐ Discuss Assessment Findings
- ☐ Review Conceptual Design
- ☐ Discuss Recommendations



# Project Goals

- ❑ Increase interoperability of radio communications for local, state and federal stakeholders in the Santa Barbara County Operational Area (SBCOA)
- ❑ Specifically, the project objectives are as follows:
  - Obtain information about current radio communications systems
  - Assess current level of system interoperability
  - Develop short and long term recommendations for improving interoperability
- ❑ Identify upgrades, frequency requirements, interfaces and budgetary costs of improving interoperability



# Project Stakeholders

Stakeholder	Law Enforcement	Fire Services
Buellton	County Contract	County Contract
California, State of	Highway Patrol	County Contract
Carpinteria	County Contract	Carp./Summerland Fire District
Goleta	County Contract	County Contract
Guadalupe	City Police Department	City Fire Department
Lompoc	City Police Department	City Fire Department
Montecito	County Contract	Montecito Fire District
Santa Barbara	City Police Department	City Fire Department
Santa Barbara County	Sheriff's Department	County Fire Department
Santa Maria	City Police Department	City Fire Department
Solvang	County Contract	County Contract
University of California, Santa Barbara	University Police Department	County Contract



# Project Status

- ✓ Task 1 – Conduct Project Planning Workshop
- ✓ Task 2 – Review Existing Materials
- ✓ Task 3 – Conduct Interviews and Focus Groups
- ✓ Task 4 – Conduct Coverage Analysis
- ✓ Task 5 – Prepare and Document Current Systems Assessment
- ✓ Task 6 – Prepare and Document Conceptual System Design
- ✓ Task 7 – Develop System Recommendations
- ✓ Task 8 – Prepare Interoperable Communications Report

# Current Systems Overview

- ❑ Document current systems, including the following radio system information:
  - Coverage
  - Capacity
  - Reliability
  - Functionality





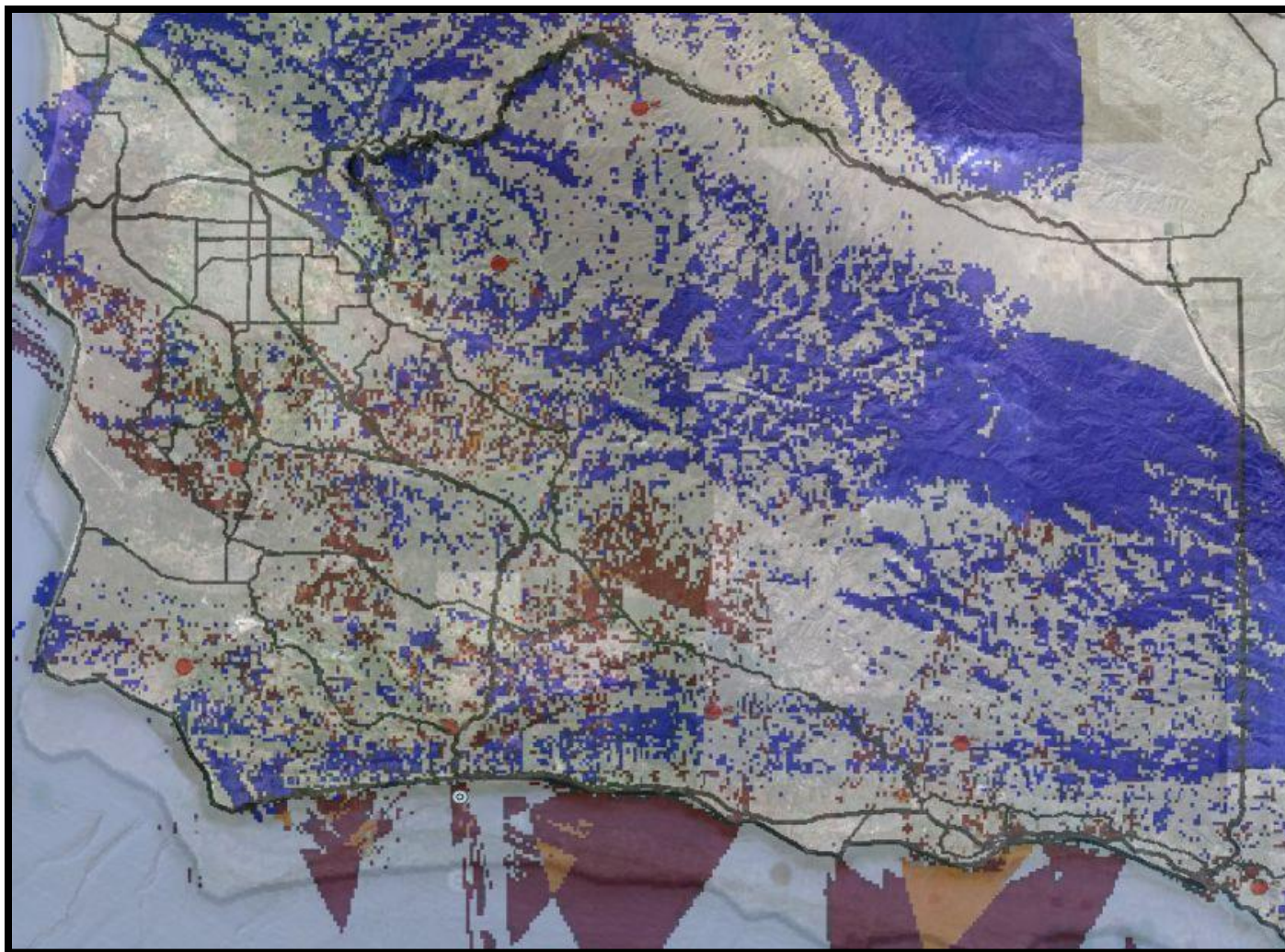
# Coverage

- ❑ Predictive coverage maps have been prepared for the following jurisdictions and channels:
  - Carpinteria-Summerland Fire District (South Coast Comm., White 2 & 3)
  - Lompoc FD (Primary & Secondary)
  - Lompoc Police Department (Green 1)
  - Montecito Fire District (MTO Ch. 1 & 2, Red 3)
  - Santa Barbara County Fire (Ch. 1-6)
  - Santa Barbara County Public Health Department (MED 5, 6, 6(a), 7, 8, 10)
  - Santa Barbara County Sheriff (SO1 & SO2)
  - Santa Barbara FD (Green 1 & 2)
  - Santa Maria Fire Department (SMR 1-4)
  - Santa Maria Police Department (PD 1-4)
  - University of California, Santa Barbara





**Figure 1**  
**Santa Barbara County Sheriff – S01 Mobile Talk-Out (Simulcast)**  
**(Sites: Casino, Gaviota, Harris, La Cumbre, Plowshare, Rincon, Santa Ynez, Tepusquet, and Sudden)**







# Capacity

Agency	Number of Repeated Channels	Platform
Carpinteria-Summerland Fire District	3 South Coast	Analog Conventional VHF
Guadalupe (Police and Fire)	Shared County Channels	Police (UHF) Fire (VHF)
Lompoc Police Department	2 City-wide	Analog Conventional UHF
Montecito Fire District	2 South Coast	Analog Conventional VHF
Santa Barbara County Fire Department	6 County-wide	Analog Conventional VHF
Santa Barbara County Public Health	1 County-wide	Analog Conventional UHF
Santa Barbara County Sheriff	2 County-wide 3 - Local	Analog Conventional UHF
Santa Barbara Fire Department	2 City-wide	Analog Conventional VHF
Santa Barbara Police Department	2 City-wide	Analog Conventional UHF
Santa Maria Fire Department	4 City-wide	Analog Conventional VHF
Santa Maria Police Department	4 City-wide	P25 Digital Conventional UHF
University of California, Santa Barbara	4 Campus-wide	800 MHz Trunked

\*\* Public works, Animal Control, Parks and Transportation departments throughout the County have a mix of systems (VHF, UHF and 800 MHz)



# Reliability

- ❑ Systems are generally built to public safety grade standards
- ❑ Reliability not cited as a major issue by any stakeholder
- ❑ Very few systems have received significant platform or infrastructure upgrades



# Functionality

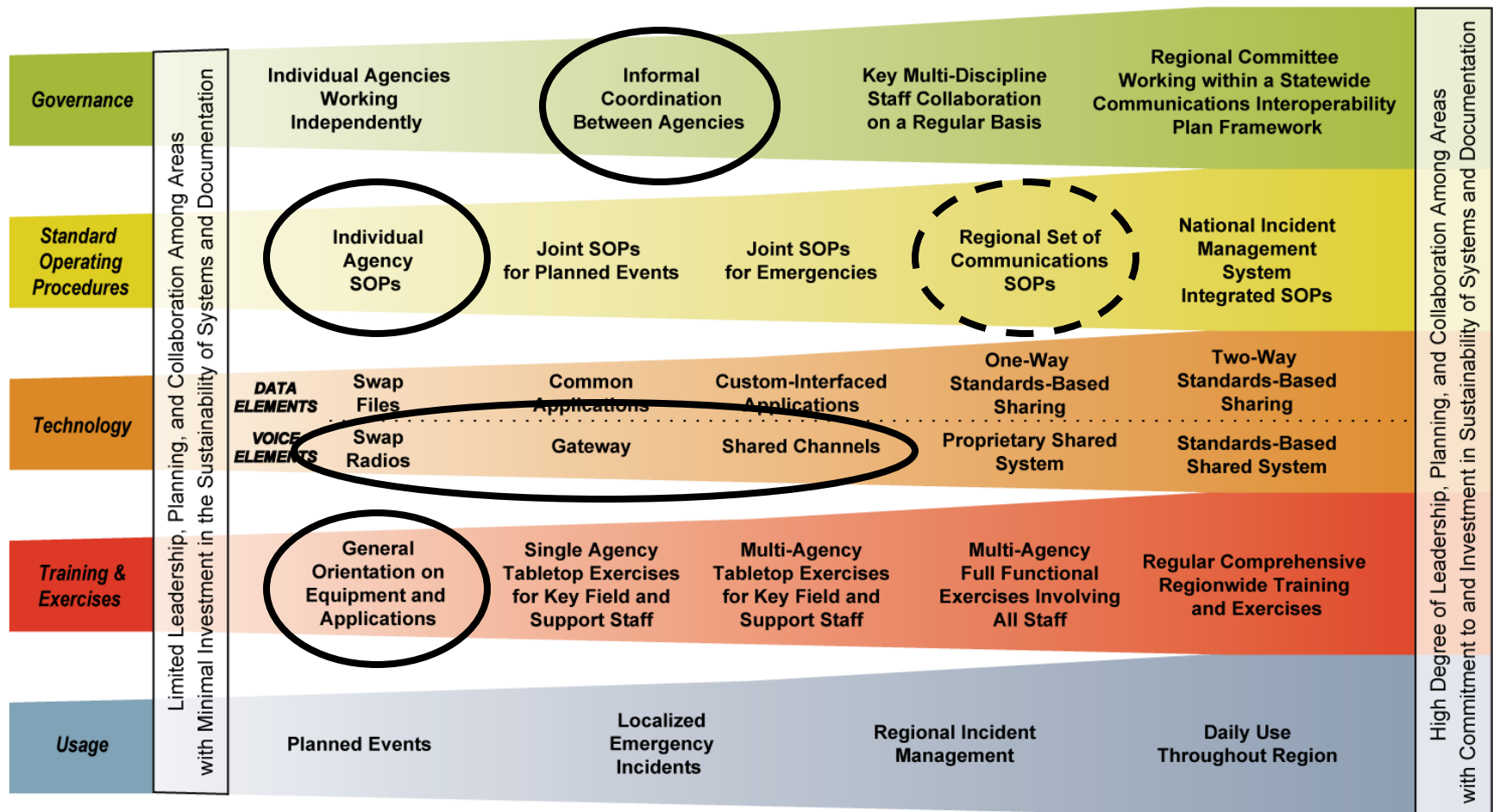
- ❑ Primarily push-to-talk (PTT) conventional voice systems
- ❑ All Public Safety voice communication systems are narrowband
- ❑ All Fire agencies operate within the VHF band
- ❑ All Law agencies, with few exceptions, operate in the UHF band
  - CHP operates on VHF-low band for dispatch and VHF-high for tactical ops
  - UCSB operates an 800 MHz trunked system, which offers site roaming, talkgroups, unit identification, asset management, etc.
- ❑ Santa Maria PD uses encryption (DES) on most channels
- ❑ SBCSO has one simplex frequency that is also encrypted
- ❑ Most agencies are using Unit ID functionality
- ❑ Some agencies are using the Emergency Button function to trigger a console alarm when needed
- ❑ AMR carries both VHF and UHF radios in each ambulance. They operate on the MED Channels operated by the Santa Barbara County Public Health Department.

# SAFECOM Interoperability Assessment



Governance	Limited Leadership, Planning, and Collaboration Among Areas with Minimal Investment in the Sustainability of Systems and Documentation	Individual Agencies Working Independently		Informal Coordination Between Agencies		Key Multi-Discipline Staff Collaboration on a Regular Basis		Regional Committee Working within a Statewide Communications Interoperability Plan Framework			
Standard Operating Procedures		Individual Agency SOPs		Joint SOPs for Planned Events		Joint SOPs for Emergencies		Regional Set of Communications SOPs		National Incident Management System Integrated SOPs	
Technology		DATA ELEMENTS	Swap Files	Common Applications		Custom-Interfaced Applications		One-Way Standards-Based Sharing		Two-Way Standards-Based Sharing	
		VOICE ELEMENTS	Swap Radios	Gateway		Shared Channels		Proprietary Shared System		Standards-Based Shared System	
Training & Exercises		General Orientation on Equipment and Applications		Single Agency Tabletop Exercises for Key Field and Support Staff		Multi-Agency Tabletop Exercises for Key Field and Support Staff		Multi-Agency Full Functional Exercises Involving All Staff		Regular Comprehensive Regionwide Training and Exercises	
Usage		Planned Events		Localized Emergency Incidents		Regional Incident Management		Daily Use Throughout Region			
High Degree of Leadership, Planning, and Collaboration Among Areas with Commitment to and Investment in Sustainability of Systems and Documentation											

# Santa Barbara County Interoperability Assessment







# Governance

- ❑ Most important success factor
- ❑ Historically, governance of interoperable communications has been informal coordination between agencies, primarily within each discipline
  - Agencies have common interests, though decision making is largely independent
  - Significant cultural and socio-economic differences between coastal south and inland north regions
  - Strong example of coordination: Fire agencies develop a regional mutual aid plan every year
- ❑ Formation of an Executive Steering Committee to oversee this project



# Standard Operating Procedures

- ❑ Written protocols for use of interoperable assets and scenario-based joint response
- ❑ TICP documents some shared procedures; however
  - Red (Law Mutual Aid), U-CALL, U-TAC, V-CALL, V-TAC and CLEMARS (UHF) are also not programmed as indicated
  - MOU for use of mobile gateways is under development
  - Scenario-based response plans are not included
  - TICP and its procedures are not generally used in practice



# Technology

- ❑ Swapping radios, gateways and shared channels are all used in practice
- ❑ Radio swapping is predominant means of achieving interoperability across bands, e.g., VHF to UHF. Agencies that carry additional radios for interoperability include:
  - UCSB issues 800 MHz radios to mutual aid partners
  - Carpinteria-Summerland BC, Montecito paramedic units and Isla Vista PD carry additional UHF radios
  - AMR carries additional VHF radios
  - Cities with County service contracts carry additional radios
- ❑ The County maintains a UHF cache and most fire agencies maintain a VHF cache of radios



# Technology (cont.)

- ❑ Three mobile gateways are available for tactical interoperability
  - Useful for planned events, e.g., Halloween
  - Most agencies are not aware of gateways or their capabilities
  - MOUs still under development
- ❑ Joint law and fire dispatch at County as well as City of Santa Barbara, Santa Maria and Lompoc allow for console patching across discipline; however
  - Console patches are not configured at County dispatch
  - Users are unaware of patching capabilities at city dispatch centers



# Technology (cont.)

- ❑ Shared channels are used within each discipline
- ❑ Shared channels should have consistent programming of frequencies, squelch tones and nomenclature
  - Agency specific (Green, White, Red, etc.)
  - CLEMARS
  - CALCORD



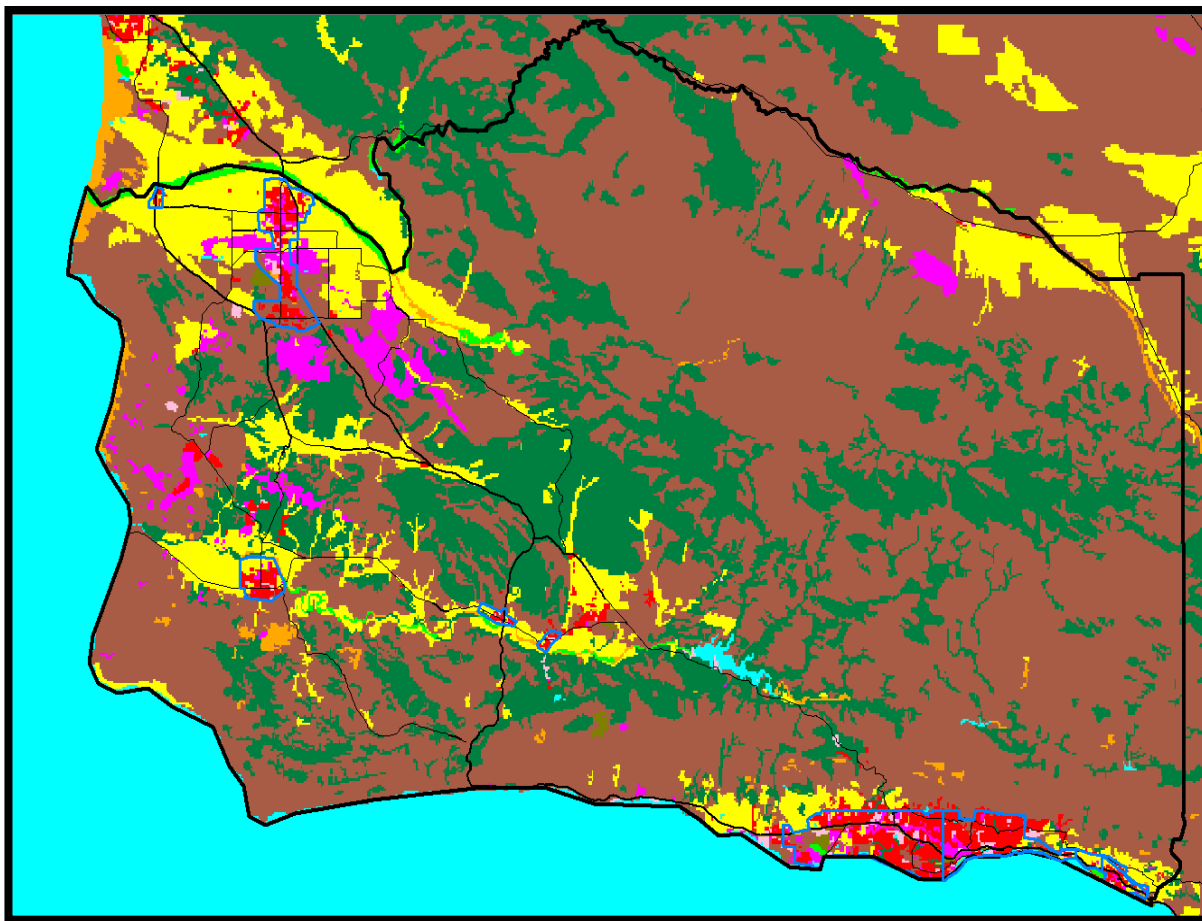


# Training & Exercises

- ❑ No formal training for use of interoperable procedures
  - Technicians are trained on deployment and use of mobile gateway devices
- ❑ Few regional exercises to practice interoperable communications have taken place
  - County Fire conducted an exercise at the beginning of June



# Santa Barbara County



Santa Barbara is a diverse county, both in its topography and its population density. The figure below illustrates the county and city boundaries and a general picture of land use throughout the county.

Color	Description
Light Blue	Water
Dark Blue	Snow Ice
Green	Wetland
Yellow	Open Land
Brown	Rangeland
Orange	Transportation
Light Green	Agricultural
Red	Residential
Dark Green	Forest
Pink	Mixed Urban/Buildings
Purple	Commercial/Industrial
Dark Purple	High Density Urban

# Conceptual Design Overview



- ❑ Standards
  - P25 Phase 2
  - Long Term Evolution (LTE)
- ❑ Platform
  - Two platforms: P25 Phase 2 800 MHz & Analog Conventional VHF
- ❑ Spectrum
  - Limiting Factor
  - Currently not enough channels in any single band to implement a single system for all users county-wide
- ❑ Architecture
  - Simulcast
  - Two systems connected by a network level gateway patch

# Conceptual Design Requirements

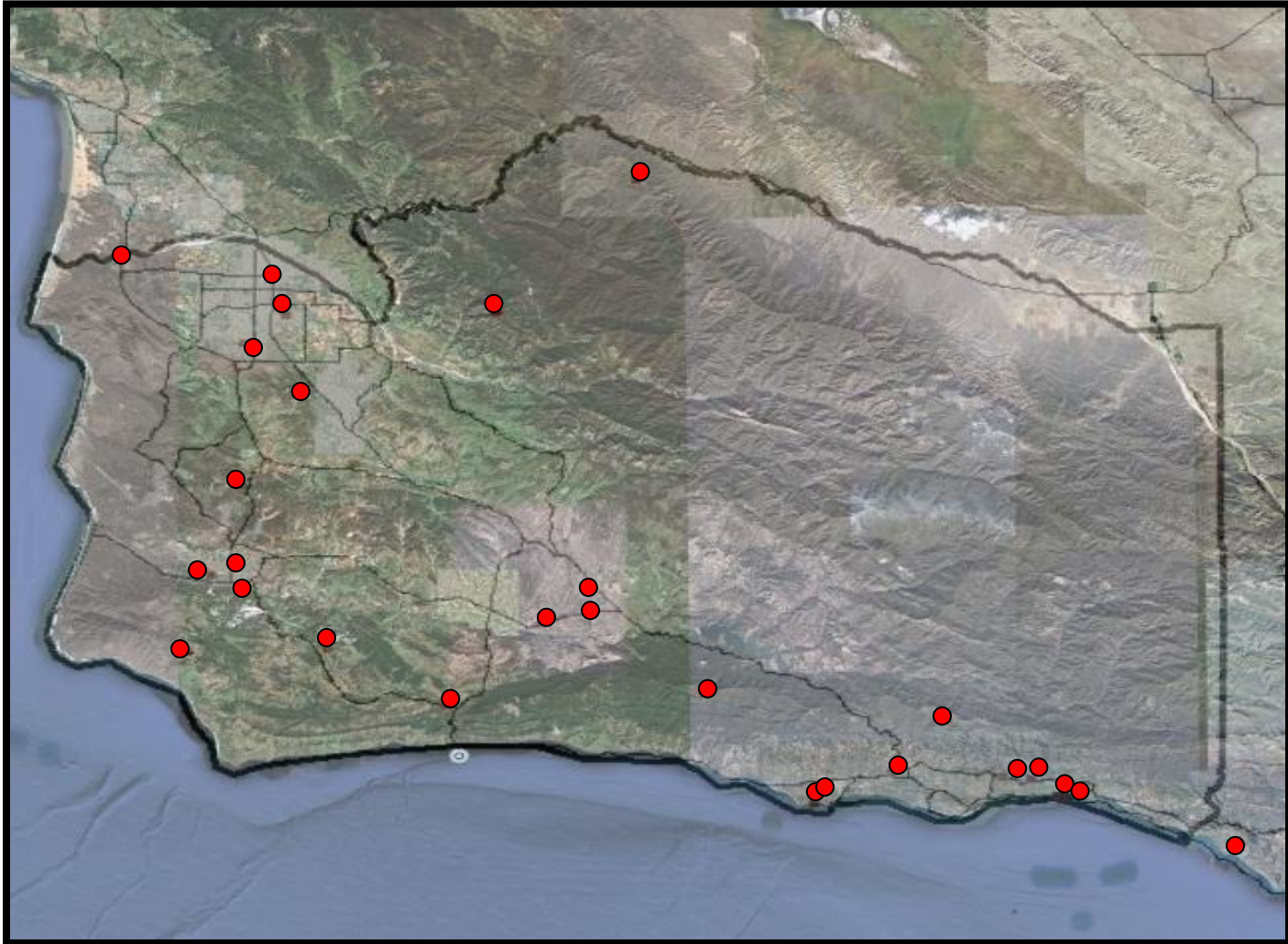


- ❑ Standard: Industry and Public Safety Standard of 3.4 Delivered Audio Quality (DAQ) with 95% reliability in the region
- ❑ Balance the need to cover two urban centers (Santa Maria & the Southern Coast) with the need for reliable communication in rural areas
- ❑ Utilize existing infrastructure





# Available Sites in Santa Barbara County





# Conceptual Design Architecture

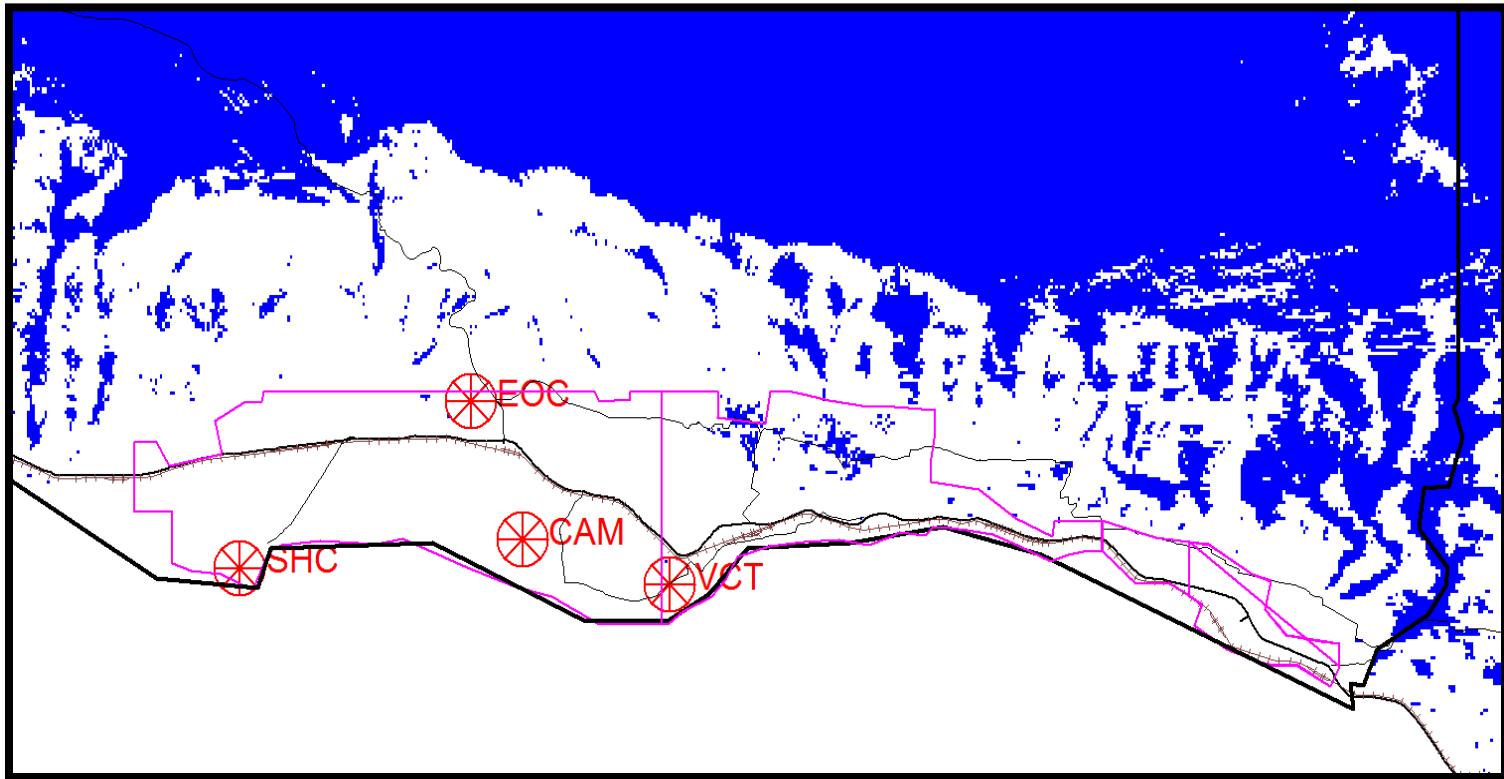


- ❑ Hybrid System
- ❑ 2 Cell Simulcast Design (700 and 800 MHz Frequencies)
  - North Cell – Covers the Cities of Santa Maria and Guadalupe
    - 2 Sites – Prell Road and Cook Street
  - South Cell – Covers the Cities of Goleta, Santa Barbara, Carpinteria, Summerland and the unincorporated Township of Montecito
    - 4 Sites – South Hall Campus at UCSB, County Emergency Operations Center, Campanil Hill and Vic Trace Reservoir
- ❑ VHF Analog Conventional Overlay
  - Single Cell Simulcast provides County-wide coverage including the Cities of Lompoc, Solvang and Buellton
    - 5 Sites – Harris Grade, Los Alamos, Gaviota, Santa Ynez and White Hills

# Conceptual Design Coverage



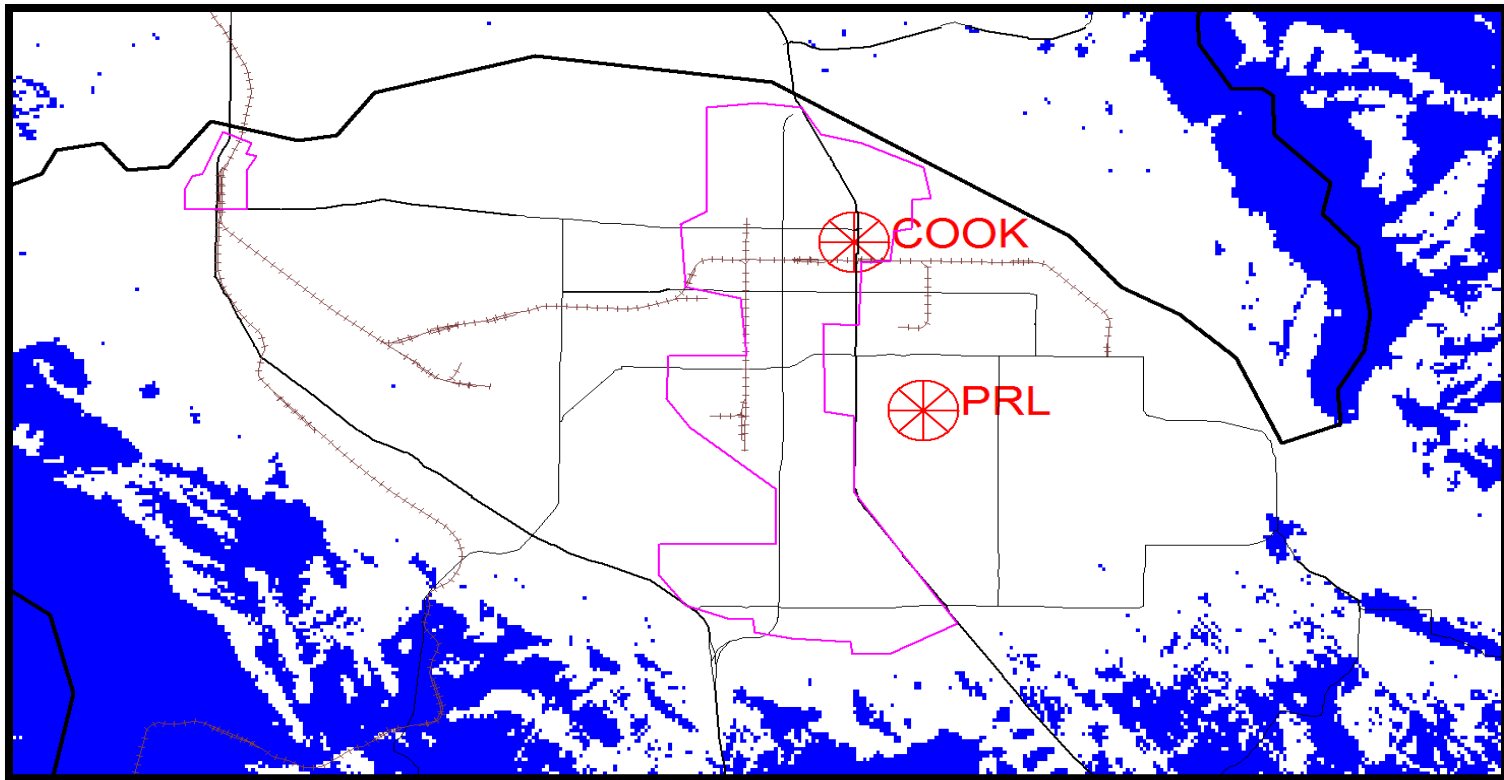
- ❑ South Cell (700/800 MHz)
- ❑ Predicted Portable Coverage with DAQ 3.4 at 95% reliability



# Conceptual Design Coverage



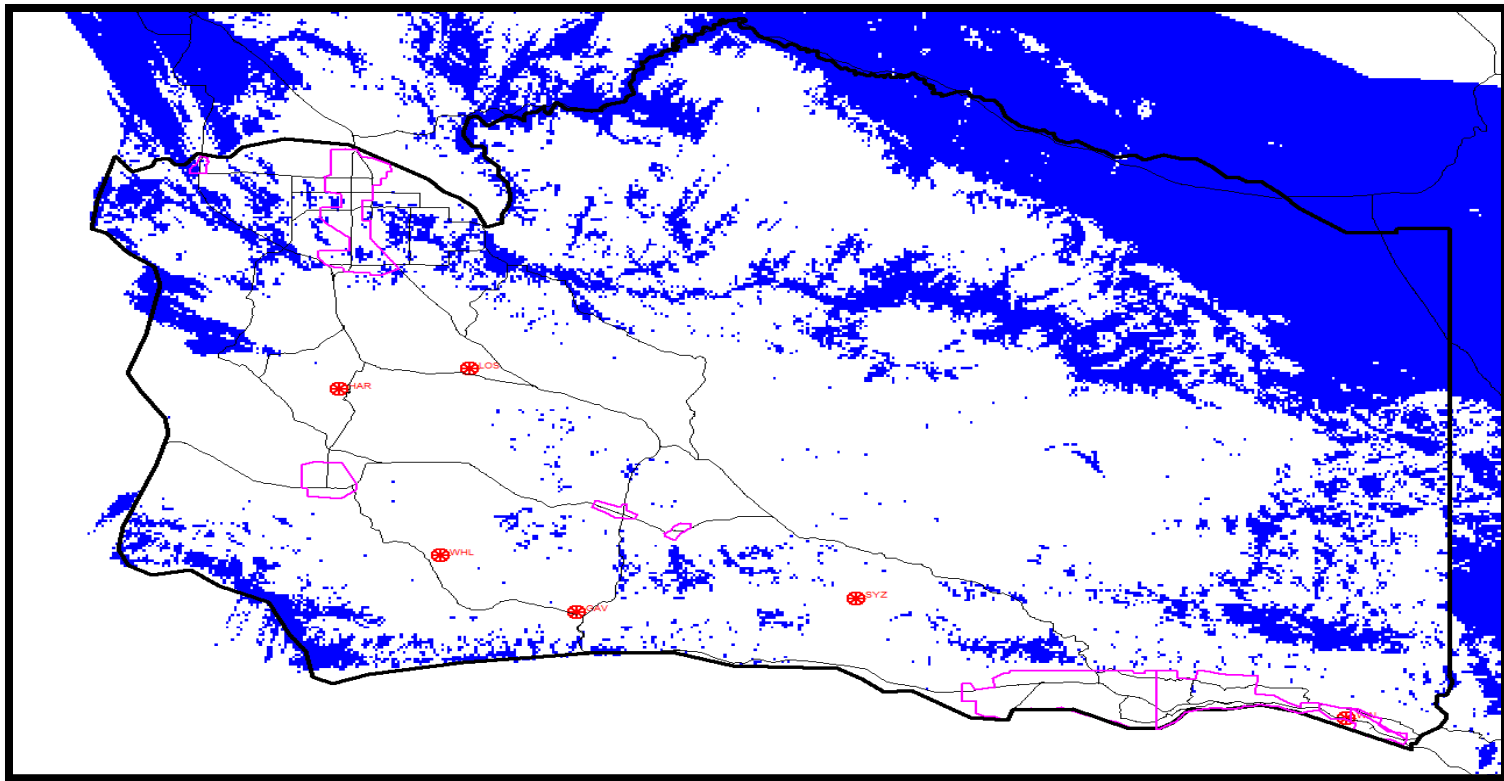
- ❑ North Cell (700/800 MHz)
- ❑ Predicted Portable Coverage with DAQ 3.4 at 95% reliability



# Conceptual Design Coverage



- ☐ VHF Analog Conventional System
- ☐ Predicted Mobile Coverage



# Conceptual Design Cost



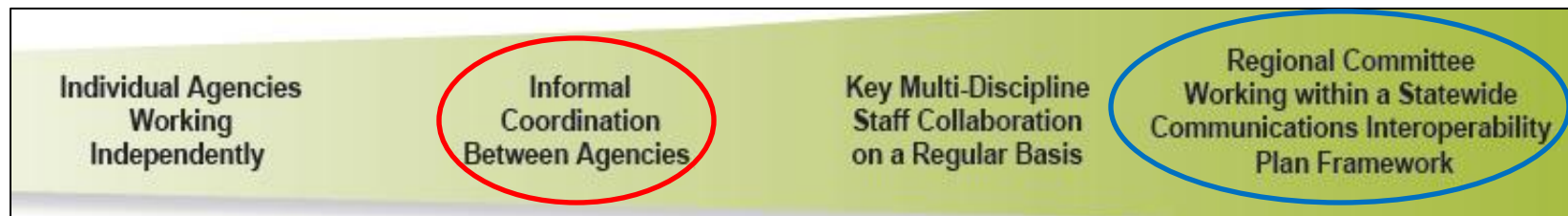
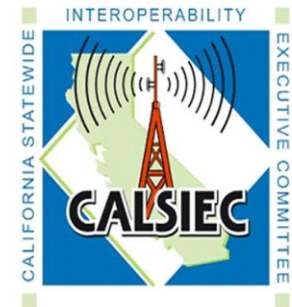
Component	Low Estimate	High Estimate
Digital Trunked Voice System Infrastructure	\$3,490,000	\$5,735,000
Upgrade of VHF Infrastructure	\$925,000	\$1,800,000
Implementation Services	\$2,011,000	\$3,467,000
User Equipment	\$12,983,600	\$19,768,000
Contingency	\$698,000	\$1,147,000
<b>Total</b>	<b>\$20,107,600</b>	<b>\$31,917,000</b>



# Recommendations Governance



- ❑ G – 1: Establish Regular Meetings of an Executive Committee
- ❑ G – 2: Designate a Representative to Work with CalSEIC Southern Planning Area
- ❑ G – 3: Oversee and Champion Implementation of Recommendations



# Recommendations

## Standard Operating Procedures



- ❑ S – 1: Identify and Establish Standard Operating Procedures for the Region's Interoperable Assets.
- ❑ S – 2: Establish Use Policies for the Region's Interoperable Assets
- ❑ S – 3: Adopt Consistent Radio Programming Templates and Nomenclature
- ❑ S – 4: Review and Approve the TICP



# Recommendations Technology



- ❑ T – 1: Deploy Radio Caches (multi-band)
- ❑ T – 2: Review Radio Programming
- ❑ T – 3: Establish Patching Capability
- ❑ T – 4: Deploy Interoperability Channels
- ❑ T – 5: Implement Standards-Based Shared Regional Radio System



# Recommendations Training and Exercises



- ❑ E – 1: Adopt Communications Exercise Program
- ❑ E – 2: Support Training on use of Interoperable Assets
- ❑ E – 3: Utilize Lessons Learned to Improve Communications

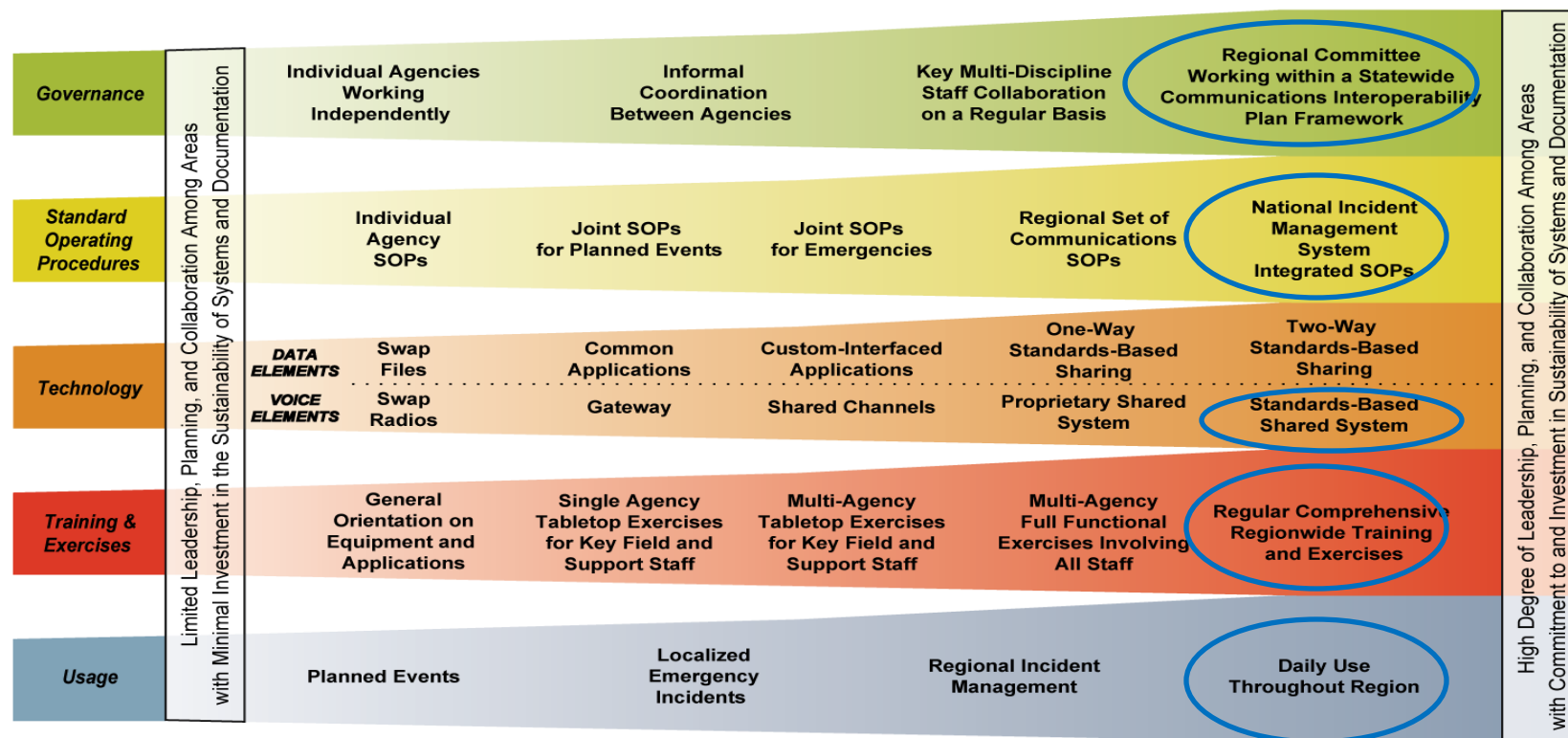


# Desired State



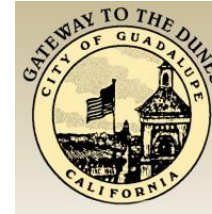
**Homeland  
Security**

## Interoperability Continuum





# Questions



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